

NOTES ON THE FLORA OF COSTA RICA, 4:

NEW SPECIES IN THE URTICACEAE

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Continued field work in Costa Rica has produced plant collections that appear to represent unnamed species in the Urticaceae. Very few of these collections represent entirely new material. More often, the new collections have provided superior specimens for species represented previously by problematical material placed under related species. In one case we have three collections of an anomalous species that does not seem to fit within presently defined genera. The very few pistils of this Taxon are usually two-locular. This is a unique condition for the family but the many other characteristics of the plants leave no doubt that they are Urticaceous, closely allied to *Boehmeria*. All the Costa Rican species of Urticaceae will be keyed and illustrated in the forthcoming *Flora Costaricensis* to be published in the *Fieldiana: Botany* series.

*BOEHMERIA RADIATA* W. Burger, sp. nov.

Frutices 1-3 m alti, aliquantum diversifoliis, internodis foliiferis 3-50 mm longis, 1-4.5 mm crassis, puberulis; stipulis 3-5 mm longis, deciduis. Folia alterna, similia formarum, petiolis 3-60 (90) mm longis, 0.3-1.8 mm crassis, puberulis; laminis 2-13 (18) cm longis, 1-7 (10) cm latis, ovatis usque ovato-ellipticis, apicibus acutis vel acuminatis, basibus obtusis vel rotundatis, pagina supra trichomatibus 0.2-1 mm longis, valde appressis, venis secundariis saepe destitutis in latere unico. Inflorescentiae globosae sessiles, 4-10 mm longae, flores masculini 2 mm longi, 1.5 mm lati, plerumque sessiles, tepalis 4, appendiculatis; flores feminei congesti, stigmatibus 3 mm longis. Fructus in tubo perianthii inclusi, 1-1.5 mm longii, tubus anguste ellipsoideus. HOLOTYPE: *Tonduz I2733* (*Herb. Inst. phytico-geogr. nat. costar. I2733*) in US (799248).

Shrubs 1-3 mm tall, bisexual or unisexual, leafy internodes 3-50 mm long, 1-4.5 mm thick, with appressed or curved thin whitish hairs 0.2-1 mm long; stipules 3-5 mm long, deciduous. Leaves differing in size at adjacent nodes but similar in shape,

petioles 3-60 (90) mm long, 0.3-1.8 mm thick, puberulent with thin whitish hairs; laminae 2-13 (18) cm long, 1-7 (10) cm broad, ovate to elliptic-ovate, acute to acuminate at the apex, obtuse to abruptly rounded at the somewhat unequal base, margin crenate-serrate with 2 to 5 teeth per cm. laminae drying thin- to stiff-chartaceous, slightly rough to the touch above with whitish strongly appressed hairs 0.2-0.8 (1) mm long, the lower surface with thin whitish hairs along the veins, venation palmate or subpalmate with 3 primary veins, midvein with 1 to 3 pairs of major secondary veins or often with the major secondaries on only one side or not readily distinguished from the smaller secondaries, minutely punctate cystoliths visible on the upper surface. Inflorescences small (4-10 mm) globose sessile clusters in the axils of leaves or at leafless nodes, sometimes with 2 to 6 glomerules in a row at leafless nodes 3-10 mm distant along the stem; male flowers about 1.5 mm broad, usually sessile, perianth-parts 4, apex of the perianth with a slender projection abaxially; female flowers very numerous and closely congested, styles and stigmas about 3 mm long, minutely puberulent. Fruit small and enclosed within the persisting slender perianth-tube 1-1.5 mm long, narrowly ellipsoid (narrowed at both base and apex), densely hirsutulous with minute brownish hairs.

Plants of the seasonally dry evergreen forest formations of the Pacific slope and Meseta Central between 500 and 1200 m elevation in Costa Rica; collected with flower and fruit from October to March. The species ranges from Guatemala to Central Costa Rica.

*Boehmeria radiata* possesses unusual appressed hairs on the upper leaf-surfaces resembling linear cystoliths and these are often arranged in circular patterns within the areoles demarked by larger tertiary veins. The seasonally dry habitat, shrubby habit, long and thin petioles, male perianth-parts with unusual apices, and very small fruit within a slender brown-hirsutulous perianth-tube further distinguish this species. Despite these features *Boehmeria radiata* is often difficult to separate from *B. ulmifolia* with shorter petioles, wetter habitat, and adjacent leaves differing more in shape or from *B. ramiflora* with the male flowers 3-parted, fruit inflated and winged, and upper leaf-surfaces without cystolith-like appressed hairs. This species has often been mistaken for *Phenax mexicanus*.

*Boehmeria radiata* is so named for the occasional radiate patterns formed by the unusual appressed trichomes of the upper leaf-surface. The species is well represented by material from Guatemala but I have seen no material from El Salvador. Honduras, or Nicaragua, and no collections of the species have been made in Costa Rica in the last two decades. This lack of newer collections may be due to habitat destruction on the mid-elevation Pacific slopes of Central America or perhaps the similarity with

more common species of *Boehmeria* and *Phenax* has caused collectors to pass them by.

The following material has been seen from Guatemala: *Aguilar* 68, 332; *Standley* 58I34, 64946, 670I9, 78345, 78467, 890I3, 895I2; *Steyermark* 3096I, 33302. The Costa Rican material seen is: *Brenes* 323 (55), 5967, 6570; *Herb. Inst. C.R.* 8956, I2733 the type; *Standley* 32262, 36086.

PILEA GOMEZIANA W. Burger, sp. nov.

Herbae 20-50 cm altae, terrestres, internodiis foliiferis 2-50 mm longis, 1-4 mm crassis, puberulis; stipulis 4-8 mm longis, persistentibus. Foliae subaequales ad quisque nodum, petiolis 1-5 cm longis, sparsim puberulis; laminis 3-15 cm longis, 2.5-7 cm latis, late ovatis usque ovato-ellipticis vel ellipticis, apicibus breve acuminatis, basibus obtusis usque truncatis, marginibus serratis, pagina supra trichomatibus ca. 1 mm longis. Inflorescentiae masculinae 1-2 cm longae, tepalis appendiculatis. Inflorescentiae femineae 2-5 cm longae, flores feminei pedicellati, partibus perianthorum inaequalibus. Fructus ca. 0.6 mm longi. HOLOTYPE: *Gomez* 3304 in F (1725938), ISOTYPE: CR, US.

Herbs, bisexual (unisexual in early stages) leafy stems erect and unbranched, 20-50 cm tall, leafy internodes (2) 7-50 mm long, 1-4 mm thick, puberulent with thin curved or crooked whitish hairs 0.3-1 mm long; stipules 4-8 mm long, broad and rounded at the apex, persisting with the leaves. Leaves usually subequal and similar in form at each node, usually differing by about 1/4 in size but occasionally with the smaller leaf 1/2 the size of the larger (at the same node), petioles 1-5 cm long, 0.4-2 mm thick, sparsely puberulent, usually sulcate above; laminae 3-15 cm long, 2.5-7 cm broad, broadly ovate to elliptic-ovate or elliptic, usually broadest below the middle, short-acuminate at the apex, obtuse to truncate at the base, margins serrate with 2 to 4 prominent teeth per cm, laminae drying very thin chartaceous or membranaceous, upper surface with evenly spaced slender and transparent hairs about 1 mm long, lower surface with smaller hairs along the veins, venation palmate with 3 (5) primary veins, the 5 to 10 pairs of secondary veins ascending, very short linear cystoliths scattered or in groups above. Male inflorescences usually in the uppermost leaf-axils, 1-2 cm long, usually of several small clusters of flowers on an unbranched rachis; male flowers subsessile, the buds about 1 mm in diameter with clavate subapical appendages 1 mm long, perianth usually with a few thin hairs. Female inflorescence in lower leaf-axils or at lower leafless nodes, 2-5 cm long, the primary rachis with 1 to 4 branches, flower-clusters very small and distant along the rachis; female flowers pedicellate, less than 0.5 mm long. Fruit about 0.6 mm long, oblong in outline with convex surfaces, pale brown, margins outlined by a submarginal ridge or dark-punctate lines.

Plants of stream sides and shaded forest on Cocos Island; collected with female flowers in August and with fruit and unopened male flowers in March. I have seen only three collections of this species: *Dressler* 4469, *Gomez* 3304 the type, and *Pittier* 16238.

*Pilea gomeziana* is distinguished by its very small flowers and fruit, subequal leaves at each node, large stipules, pubescence of slender hairs, and isolated habitat. This species appears to be related to *P. pittieri* and *P. pubescens* among Costa Rican species. Closer relationships are to be expected with South American species but I have not been able to find any.

This species is named in honor of Luis Diego Gomez P. Director of the Museo Nacional de Costa Rica. Sr. Gomez was the first to collect ample fertile material of these plants. He did this during his solitary residence of over one month on Cocos Island.

PILEA TILARANA W. Burger, sp. nov.

Herbae 10-40 cm altae, terrestres, internodis foliiferis 2-20 mm longis, 1-3 mm crassis, glabris; stipulis minutis. Foliae dissimillimae and quisque nodum, laminis parvis plus minusve sessilibus, 5-20 mm longis ovatis usque late ellipticis; laminis magnis petiolis 0.5-5 mm longis, 2-12 mm longis et 0.7-3.3 mm latis, anguste ellipticis usque oblongo-ellipticis, obtusis apicem, basibus acutis et inaequalibus, marginibus crenatis vel serratis, glabris, venatione palmata, nervis utroque costae latere 2. Inflorescentiae masculinae ignotae. Inflorescentiae femineae 1-2 cm longae, flores feminei partibus perianthorum inaequalibus. Fructus ca. 3 mm longi et 2 mm lati, lenticulares, ovati vel suborbiculares, atrobrunnei. HOLOTYPUS: *Standley & Valerio* 44753 in US (1252091).

Herbs, usually terrestrial and erect, 10-40 cm tall, unisexual, leafy internodes (2) 5-20 mm long, 1-3 mm thick, glabrous, cystoliths apparent; stipules reduced to a ligulate ridge about 0.2 mm high. Leaves of the same node very different in size and form but the small leaves on creeping (repent) stems sometimes isomorphic, the small leaves of a pair sessile or subsessile, petioles of the larger leaves 0.5-5 mm long, decurrent on the stem; smaller laminae 5-20 mm long, usually ovate to broadly elliptic, larger laminae 2-8 (12) cm long, 0.7-2.5 (3.3) cm broad, narrowly elliptic to elliptic-oblong or elliptic-lanceolate, obtuse at the apex, acute at the asymmetric and oblique base or slightly rounded on one side, crenate-serrate with 2 to 4 slightly raised teeth per cm, laminae drying thin chartaceous and dark above, smooth and glabrous on both surfaces, venation subpalmate with the 2 lateral veins arising near the base of the midvein, secondary veins 3 to 12 pairs and often obscure, cystoliths most-

ly linear, apparent on both surfaces. Inflorescences unisexual, 1-2 cm long, male inflorescences probably borne on the leafless lower portions of the stem, cymose (?), female flowers in cymose clusters of 4 to 20 flowers on a peduncle 1-10 mm long; male flowers not seen; female flowers with perianth parts of 2 lengths, the longer 2 mm long, pistil 1-2 mm long with prominent (0.4 mm) fimbriate stigma. Fruit about 3 mm long and 2 mm broad, flattened and lenticular, suborbicular to ovate in outline and narrowed at the apex, stigma often persisting, drying dark brown.

This species is known only from the evergreen cloud forest (premontane wet forest) formations between 600 and 1000 m elevation near Tilarán (Guanacaste) and near San Ramón (Alajuela) in Costa Rica; probably flowering throughout the year. The species occurs only along the Pacific side of northern Costa Rica.

*Pilea tilarana* is recognized by the leaves very different in size at the same node, the larger leaves relatively narrow and with very shallow teeth, small inflorescences, large fruit narrowed at the apex, terrestrial habit, and the restricted range. This species is closely related to *P. chiriquina* Killip of western Panama and *P. seemannii* Killip of northern South America. *Pilea tilarana* is generally of smaller stature than either of those species and possesses much larger fruit. Collections of this species were previously identified as *P. pansamalana* Donn.-Smith of Guatemala but that species has smaller fruit, leaves that are more prominently serrate, and an epiphytic life-style. The latter resembles *P. diversissima* Killip among Costa Rican species.

Collections by Standley and Valerio (44742, 44753 the type, & 44758) from near Tilarán are generally larger and more robust than the collections from near San Ramón (*Brenes* 4527 & *Lent* 2590). I expect that the species ranged across the Cordillera de Tilarán as far east as the area near San Ramón in a narrow altitudinal zone of forest that is now largely destroyed.

#### A SPECIES OF UNCERTAIN POSITION

Herbs or subshrubs, erect to 50 cm tall or scandent, usually with slender roots at most nodes, apparently bisexual, leafy internodes (1) 2-9 cm long, 0.7-3.5 mm thick, puberulent with short (0.1-1.3 mm) thin whitish hairs, becoming sparsely puberulent and dark reddish in color; stipules 5-10 mm long, 1.5 mm broad at the base, aculeate and persisting, glabrescent. Leaves opposite, isomorphic or differing slightly in size or petiole-length at the same node, petioles (2) 4-30 (50) mm long, 0.5-1.3 mm thick, puberulent; laminae 2-11 cm long, 1-7 cm broad, ovate, acuminate at the apex, abruptly narrowed at the obtuse to sub-

truncate base, coarsely serrate with 2 to 6 teeth per cm, laminae drying membranaceous to thin chartaceous and dark in color, becoming slightly rugose in age, sparsely puberulent with thin lustrous hairs 0.7-2 mm long, more densely puberulent with shorter hairs on the veins beneath, venation palmate with 3 primary veins, midvein with 2 to 4 pairs of prominent secondary veins, minute dark-punctate cystoliths visible above. Inflorescences fasciculate in the leaf axils, flower clusters about 8 mm long and usually subtended by the 4 persisting stipules; male flowers sessile or pedicellate, perianth about 2.5 mm long including a narrow subapical projection 1-1.5 mm long, filaments about 2 mm long, anther 1 mm long; female flowers about 1 mm long with a central longitudinal groove and 2 short stigmas. Fruit sessile in the axils of lower leaves 1-2 mm long, 2- or 3-angled, stigmas apparently persisting, locules 2 (3), the fruit very tightly enclosed within the (apparent) perianth-tube.

Plants of the very wet Caribbean slopes of central Costa Rica between 1000 and 1500 m elevation; apparently flowering throughout the year. This species is known only from the Río Claro (Río Claro-Río Hondura drainage) below La Palma (*Burger et al.* 4137, 6270, & 7651) in the province of San Jose and above Cachí (*Lent* 1607) in Cartago Province.

This species is recognized by the opposite leaves subtending small clusters of flowers, the usually 4 persisting stipules at each leafy node, the 4-parted male flowers with projections on the perianth-parts, the 2- or 3-angled fruit tightly enclosed within a perianth-tube that is unlobed apically, and the presence of usually 2 locules, each with a seed. The latter condition violates a basic character of the Urticaceae: an ovary with a single locule containing a single ovule. I believe the present situation may be due to the growing together of two female flowers. The longitudinal groove favors this interpretation. Because the stigmatic areas of these flowers are so small, it may be that the fruit develop without pollination.

The unusual fruit and opposite leaves make it difficult to place these plants. Because of the 4 separate stipules and sessile clusters of flowers I believe that they are closely allied to the genus *Boehmeria*.

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